JACK PINE

... an American wood

Approximately 98 percent of the jack pine growing in the United States is located in the Lake States where it has become an important pulpwood species. Jack pine grows farther north (into Canada) than any other American pine. It belongs to the hard-pine group, and is included as one of the important northeastern yellow pines along with red pine and pitch pine. It maintains itself well in dry sandy soils, and in many ways resembles the lodgepole pine of the West. The wood is moderately light and soft, moderately low in bending strength and shock resistance. Jack pine is used principally for pulpwood. It is also used for rough construction, boxes, crates, and shipping containers.

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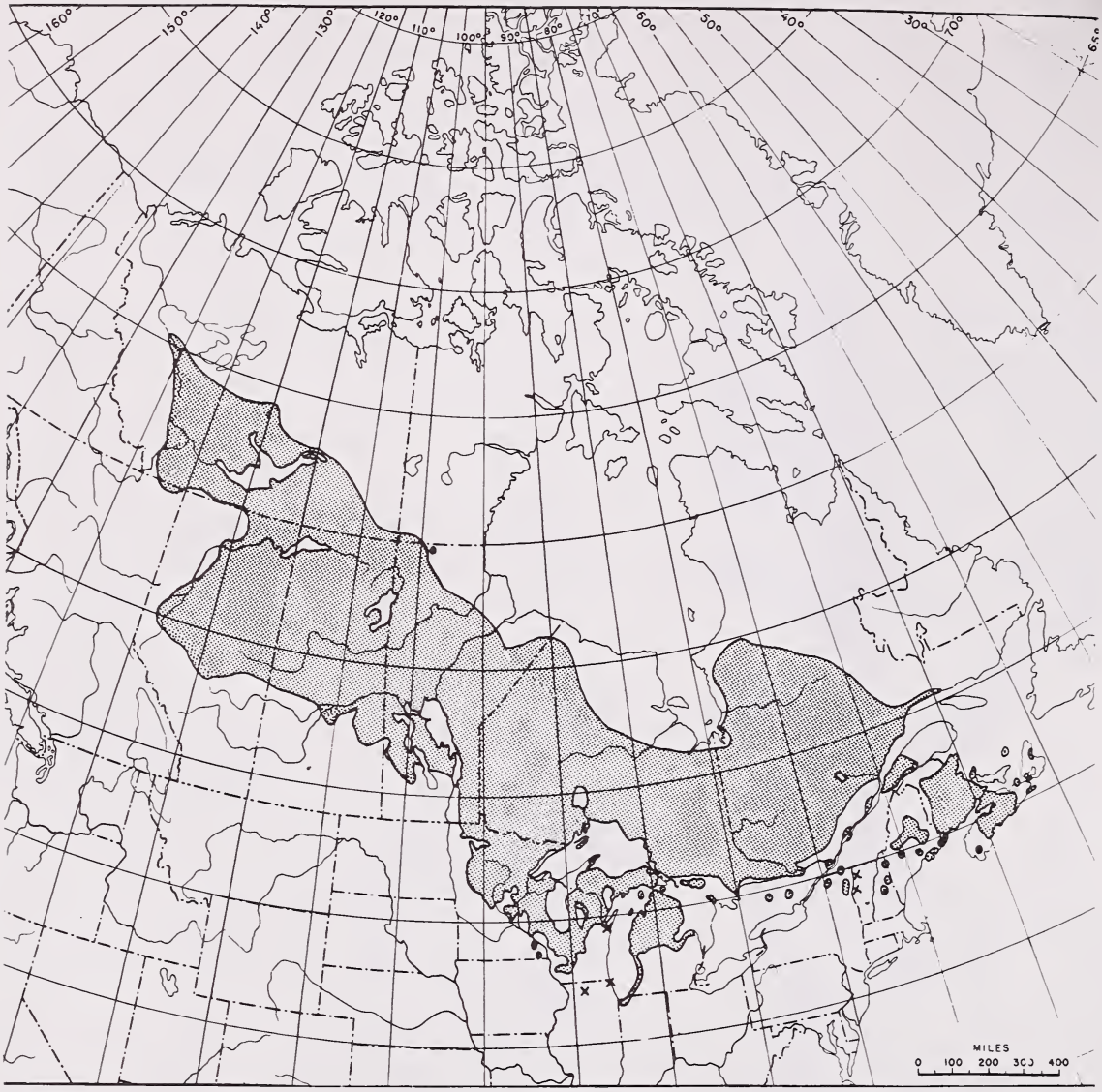

Figure 1.—Natural range of jack pine. F-521581

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JACK PINE

. . . an American wood

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DISTRIBUTION

The natural range of jack pine (*Pinus banksiana* Lamb.) extends from the Maritime Provinces west to Alberta and the District of MacKenzie in Canada, and southward to the Lake States of Minnesota, Wisconsin, and Michigan (fig. 1). Local stands are found also in northern Illinois, northern Indiana, northern New York, central Maine, Vermont, and New Hampshire. Perhaps 70 percent of its natural range can be considered commercial range. Jack pine has been planted outside its natural range in windbreaks. Commercial stands have been established on strip mine spoil banks in the east central United States and in the sandhills of Nebraska and central North Dakota.

The species generally grows in areas characterized by warm-to-cool summers, very cold winters, rather low rainfall, light sandy soils, and level-to-rolling topography. Although it occurs near the Atlantic coast, jack pine grows chiefly in a continental climate. It has the distinction of growing farther north than any other pine.

Where it is most abundant in the Lake States and Canada, jack pine grows most commonly on sand plains. Less commonly it occurs on sand dunes, rock outcrops, glaciated hills, muskegs, and steep valley slopes. Jack pine can survive on very dry sandy or gravelly soils where other species cannot, but grows best on well-drained loamy sands where the midsummer water table is 4 to 6 feet below the soil surface. Jack pine is found chiefly at elevations between 1,000 and 1,500 feet above sea level, but grows at sea level on the Atlantic coast up to 2,500 feet in New Hampshire.

In the northern Lake States and parts of central and western Canada, jack pine stands cover large areas. Jack pine is one of the species most intolerant of shade within its natural range. Therefore, it normally forms even-aged stands and when it occurs in mixtures with other species, jack pine must predominate if it is to compete. Frequently it grows in mixtures with red pine, northern pin oak, quaking and bigtooth aspen, and paper birch. Less frequent associates include eastern white pine, balsam fir, red maple, red oak, white oak, black spruce, and white spruce.

DESCRIPTION AND GROWTH

Mature jack pines normally are 55 to 65 feet tall, and 8 to 10 inches in diameter at breast height. The largest jack pine reported in the United States is 91 feet tall and 25 inches in diameter. Average merchantable yield at age 60 in well-stocked, unmanaged stands, ranges from about 1,600 cubic feet per acre on poor sites to about 2,900 cubic feet on good sites.

The species generally develops a wide-spreading and only moderately deep root system. However, a taproot frequently develops which may penetrate below 9 feet. Trees without distinct taproots usually have lateral roots which grow downward as they approach other trees. The bulk of the root system consists of laterals confined largely to the upper 18 inches of soil, and most of these are found in the top 6 inches. Roots may spread laterally at least 28 feet.

Jack pine needles grow in pairs ¾ to 1½ inches long. They are yellow green, flat or slightly concave on the inner surface, divergent, stout, and are often twisted (fig. 2). They last for 3 years. The bark of jack pine is thin, brown, slightly tinged with red or dark gray, and is irregularly divided into scaly ridges (fig. 3).

Jack pine cones are 1½ to 2 inches long, oblong-conic, light brown, usually pointing forward and often strongly incurved with the scales well developed only on the outer face (fig. 2). Seeds are $\frac{1}{12}$-inch long, triangular, black and roughened, with wings about ⅓-inch long. The cones may remain tightly closed for 25 years or more over most of its range. Along the southern edge of their range jack pines bear cones which open

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Figure 2.—Needles and cones of jack pine.

promptly upon ripening, dispersing their seeds in autumn. Closed cones are usually opened by a temperature of 120°F induced by fire or by close contact with the ground surface warmed by the sun, although some seeding occurs from cones which do open every year. This accumulation of seed in closed cones accounts for the dense jack pine regeneration that often follows after the parent stand is killed by fire.

Jack pine stands from 10 to 185 years of age produce viable seed, reaching a peak at 40 to 50 years. Where closed cones are common, a good seed supply is always available at any time of the year. Commercial seed averages about 123,000 sound seeds per pound.

Jack pine seed germinates best in partial shade on mineral soil when maximum air temperature reaches about 65°F and moisture is adequate. Shade and reasonably abundant moisture also favor initial establishment, but later height growth is greatest at one-half or more of full sunlight. Summer droughts and high surface soil temperatures frequently kill or injure young jack pine seedlings.

In well-stocked stands, jack pine develops into a rather slender tree with a narrow open crown. As the stand closes and matures, up to two-thirds of the lower crown may die. Self-pruning proceeds moderately well in dense stands, but dead branches may last for many years in partially stocked stands. Open-grown jack pines have poor form and the crowns assume a spreading appearance with live branches persisting almost to the ground.

Jack pine is relatively windfirm although wind breakage may be common, especially in conjunction with glaze or ice storms. Early spring fires can readily kill reproduction as well as young trees up to 4 inches in diameter. Hot surface fires can completely kill pole-sized stands or cause serious butt-scarring. Mature jack pines are relatively fire-resistant. The jack pine budworm may cause damaging defoliation, with areas as large as 50,000 or 60,000 acres being heavily infested. Several sawflies, as well as the pine tussock moth, may also cause serious local problems.

F–243431

Figure 3.—Scaly ridged bark of jack pine.

Under management, precommercial and intermediate cuts can approximately double the total yield of jack pine stands. Natural regeneration can be obtained in advance on poor sites by a shelterwood cut 10 years prior to the final harvest cut. All sites may be regenerated after the final harvest cut by disturbing the soil surface or by prescribed burning followed by scattering cone-bearing slash, direct seeding, or planting. Where brush or hardwood competition becomes severe, release by herbicides may be necessary.

COMMON NAMES

Jack pine is less commonly called gray pine, scrub pine, and banksiana pine.

SUPPLY

In 1963 there were 1.5 billion cubic feet of sound jack pine growing stock in the United States.[2] Of this volume, 97.5 percent was in the Lake States with over one-half in Minnesota. Sawtimber volume exhibited a similar pattern, with 98 percent of the 2.3 billion board feet located in the Lake States—two-thirds in Minnesota. New York and Maine accounted for most of the remaining volume in both categories. More recent surveys in Michigan (1966) and Wisconsin (1968) show jack pine growing-stock volume to have decreased 4.4 percent in Michigan and increased 180 percent in Wisconsin.

PRODUCTION

A canvass of Minnesota sawmills showed that 9.7 million board feet of jack pine lumber was produced there in 1965. Data are not available for other States. However, if each cut an amount in the same proportion to its 1963 sawtimber volume, as did Minnesota, approximately 14.5 million board feet of jack pine lumber would have been produced throughout the jack pine range in 1965.

In the Lake States, jack pine is second to aspen in terms of volume of pulpwood harvested. An annual average of 591,000 cords was cut during the period 1960–69, ranging from a low of 515,000 cords in 1961 to a high of 721,000 cords in 1966.[3] The annual average cut by States was: Minnesota, 212,000 cords, Michigan, 198,000 cords, and Wisconsin, 181,000 cords.

Other products have been reported for the Lake States as follows:

Year	State	Piling	Poles	Posts	Misc. products	Fuelwood
		(*M lin. ft.*)	(*M pcs.*)	(*M pcs.*)	(*M cu. ft.*)	(*M cds.*)
1960	Minnesota	65	76	226	158	28
1965	Michigan	0	0	5	703	1
1967	Wisconsin	25	29	390	0	3

CHARACTERISTICS AND PROPERTIES

The sapwood of jack pine is nearly white and generally makes up at least 50 percent and often more of the volume of the bole. This is true even in older trees. The color of the heartwood varies from light brown to a distinct orange cast. The wood is moderately light in weight (30 pounds per cubic foot at 12 percent moisture content), moderately low in bending and compressive strengths, lacking in stiffness, moderately soft and moderately low in shock resistance. It also has moderately small shrinkage. In workability with tools it ranks average. It is more apt to split when nailed than red pine, and is slightly below red pine in nail-holding power. Jack pine has very limited natural durability when exposed to conditions favorable to decay. It is moderately difficult to penetrate with preservative, although incising the wood prior to treatment usually gives satisfactory results. In paint-holding ability jack pine rates below white pine. For most of the above characteristics, jack pine ranks slightly above or comparable to the spruces and true firs.

Jack pine lumber is generally knotty, has a coarser textured, more resinous appearance than white or red pine, and is often mixed with the lower grades of these species for distribution. Jack pine lumber is somewhat prone to warp and check in drying.

PRINCIPAL USES

Jack pine is used principally for pulpwood, and while it is suitable for the manufacture of paper pulp by several processes, most is pulped by the sulfate method. Pitch is a problem with both the sulfite and groundwood methods. The sulfate process yields a very strong pulp useful for wrapping papers, high-grade printing paper, fiberboard, and hardboard. Jack pine pulp is often used in mixture with groundwood and other pulps for a wide range of products.

Jack pine lumber, being knotty and generally less desirable than the associated white pine, is used more for

[2] Growing stock includes live trees at least 5 inches in diameter at breast height and larger. Sawtimber includes trees 9 inches in diameter at breast height and larger.

[3] Data include a small quantity of red and white pine.

rough local construction as well as for boxes, crates, and shipping containers. A 1965 study of wood used by selected manufacturing industries, which accounted for 4.8 million board feet of jack pine lumber, showed 82 percent used in shipping containers by the heavy manufacturing and appliance industries, 17 percent used in prefabricated wood buildings and structural members, and the remaining 1 percent divided between hardwood dimension and flooring mills and wirebound-box and -crate manufacturers.

In the past the wood has been listed by various sources as being used for poles, posts, piling, mine timber, railway ties, slack cooperage, and fuel. Small amounts of jack pine are still being used for many of these purposes, especially small poles and posts.

Jack pine can be an important food for wildlife. Wisconsin deer reportedly prefer the buds and twigs of jack pine as a second-choice food, ahead of those materials eaten only under starvation conditions. Jack pine reproduction has been reported as heavily browsed in Itasca State Park in Minnesota. The seeds are used as a diet supplement by songbirds and upland game birds, as well as by small mammals.

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